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with his chivalrous devotion to a "complete mental system," and with his courage in the use of his speculative imagination—he is a veritable knight errant in petrology.

J. P. IDDINGS

BATAVIA, JAVA,

August 3, 1914

Bacteria in Relation to Plant Diseases. By ERWIN F. SMITH, in charge of Laboratory of Plant Pathology, Bureau of Plant Industry, U. S. Department of Agriculture. Volume three. Vascular Diseases (Continued). Washington, D. C. Published by the Carnegie Institution of Washington, 1914. Quarto, viii + 309 pp.

It is not so many years since we were assured by some foreign bacteriologists that bacteria did not and could not produce diseases of plants. Less than a dozen years ago the writer of this review took part in an impromptu discussion in the bacteriological laboratory of one of the German universities in which it was vehemently contended on the one side that American bacteriologists showed their incompetence by thinking that the bacteria they found in plants had any pathological significance. Even pear blight was held to be due to some other than bacterial action. The sweeping assertion was made that no plant diseases whatever were due to the presence of bacteria.

The three stately volumes which Dr. Smith has already issued remind one of these recent opinions, and one wonders what can now be said by these same disbelievers in the pathogenic relation of bacteria to the diseases of plants. At any rate, Dr. Smith has here marshaled an array of facts that must be staggering to one who still feels that bacteria do not cause plant diseases.

The present volume deals about equally with diseases of monocotyledons and dicotyledons, principally with diseases of sugar-cane and maize, and with those of potato, tomato and tobacco. A full account is given of Stewart's disease of sweet corn and all the evidence going to show that it is disseminated on the seed. The morphology and cultural characters of *Bacterium solanacearum* which pro-

duces the "Brown Rot" of potatoes and other related plants are given in full. The destructive tomato disease, due to *Aplanobacter michiganense*, is also illustrated and distinguished from that due to *Bacterium solanacearum*. Growers of tobacco will find a separate chapter on the bacterial wilts of tobacco.

Throughout the book are found more than 150 text illustrations, and 47 full-page plates, some of the latter colored. The reader will share the author's satisfaction with the way that the printer has been able by the use of excellent paper and ink, and carefully selected type, to bring out the text and the illustrations. In passing it should be noted that only twenty-nine of the illustrations are borrowed from other authors, so that in this regard also this book is a contribution to the literature of plant pathology.

Although this volume was issued in the early part of August, 1914, it is known that the manuscript left the author's hands about two years earlier. During its slow progress through the printer's hands Dr. Smith has added many a paragraph and illustration, so that in fact the volume has been brought down as close as possible to its date of issue.

We need only pause a moment to call attention to the admirable index, which is all that an index should be. It is first of all an alphabetical index of the topics treated and the terms used, but, in addition, these are so systematically arranged that the index is a conspectus of the whole volume, and especially of its various sections.

As the writer of this review runs over this volume and its predecessors he is still more impressed with the feeling that some of these days the botanists of this country must ask very emphatically for a text-book on plant diseases prepared by Dr. Smith. A text-book from his hand could do much to place plant pathology on a truly scientific basis.

CHARLES E. BESSEY

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The Bacteriological Examination of Food and Water. By W. G. SAVAGE. Cambridge, England, University Press.